

machine element; and

a sensor ~~attached to~~ on the interior surface of the machine element and positioned to detect intensity of light within the machine element wherein the intensity of light corresponds to a position of the head element within the machine element at any point between the first end and the second end.

2. (Original) The apparatus of Claim 1 further comprising:

a coating on the shaft element.

3. (Previously amended) The apparatus of Claim 1 further comprising:

a coating on the interior surface of the machine element.

4. (Original) The apparatus of Claim 1 further comprising:

a seal disposed around the shaft element.

5. (Previously amended) The apparatus of Claim 1 further comprising:

a second sensor attached to the first wall.

6. (Previously amended) The apparatus of Claim 1 further comprising:

a first brush positioned at the second wall of the machine element.

7. (Original) The apparatus of Claim 6 wherein the first brush is constructed from wire.

8. (Previously amended) The apparatus of Claim 1 further comprising:

a second light source attached to the machine element at the first wall of the machine element.

9. (Previously amended) The apparatus of Claim 1 wherein the light source is attached at the second wall.

10. (Previously amended) The apparatus of Claim 1 further comprising:

a coating on the head element.

11. (Currently amended) An apparatus for cleaning a machine component, the apparatus comprising:

a machine element having a body defining an interior wherein the body has an interior surface and a length defined between a first end and a second end wherein the first end has an interior wall and an exterior wall opposite the interior wall;

a shaft element movable within the machine element;

a head element attached to the shaft element and adjacent to the interior surface of the machine element; and

a first brush positioned on the exterior to wall of the first end of the body ~~of the machine element wherein the first brush in contact with~~ contacts the shaft element.

12. (Original) The apparatus of Claim 11 further comprising:

a seal disposed around the shaft.

13. (Original) The apparatus of Claim 11 further comprising:

a coating on the shaft element.

14. (Previously amended) The apparatus of Claim 11 further

comprising:

a second brush positioned exterior to the body of the machine element.

15. (Original) The apparatus of Claim 11 further comprising:

a light source attached to the machine element.

16. (Original) The apparatus of Claim 11 further comprising:

a sensor positioned to receive reflected light within the machine element.

17. (Previously amended) A method for measuring displacement of a machine element, the method comprising the steps of:

providing a machine element having a body defining an interior wherein the body has an interior surface and a length defined between a first end and a second end;

providing a shaft element capable of movement within the machine element;

attaching a head element to the shaft element;

positioning the head element adjacent to the interior surface of the machine element;

attaching a light source to the machine element on a first side of the head element;

attaching a sensor to the machine element on a second side of the head element wherein the first side and the second side are not the same; and

measuring intensity of light within the machine element from

reflected light detected by the sensor.

18. (Original) The method of Claim 17 further comprising the steps of:

moving the shaft element; and

producing an output signal as the shaft element moves within the machine element.

19. (Previously amended) The method of Claim 18 further comprising the steps of:

providing a processing unit that receives the output signal; and displaying the output signal.

20. (Currently amended) The method of Claim 17 further comprising the step of:

positioning a seal ~~exterior to~~ within the machine element.

21. (Original) The method of Claim 17 further comprising the step of:

attaching a first brush to the machine element.

22. (Previously amended) The method of Claim 21 further comprising the step of:

attaching a second brush to the machine element.